

1. An inductive-type magnetic write head with a two-element coil and reduced coil resistance comprising:

a lower magnetic pole formed of magnetic material;

a pole tip formed of magnetic material on a front portion of said lower magnetic pole and extending vertically above said pole;

a back-gap element formed of magnetic material on a rear portion of said lower magnetic pole and extending vertically above said pole;

an upper magnetic pole formed of magnetic material and extending horizontally between said back-gap element and said pole tip, said upper pole having a rear portion contacting an upper surface of said back-gap element and a front portion extending over said pole tip and separated from said pole tip by a write gap layer;

a dual element conducting coil formed above said lower magnetic pole, between said pole tip and said back-gap element and below said write gap layer, said coil comprising two horizontal planar coil elements vertically disposed above each other and vertically separated from each other by an insulating patch layer of minimal thickness and wherein the windings of the lower coil element have a greater cross-sectional area than the windings of the upper coil element to provide a reduced coil resistance.

2. The write head of claim 1 wherein said coil elements are vertically separated by an alumina patch layer of thickness between approximately 1000 and 3000 angstroms.

3. The write head of claim 1 wherein the height of the coil windings of the lower coil are between approximately 1.0 and 2.5 microns.
4. The write head of claim 1 wherein the width of both the first and second coil element windings is between approximately 0.5 and 2.0 microns.
5. A method of forming an inductive-type magnetic write head with a two element coil and reduced coil resistance comprising:
 - providing a lower magnetic pole piece having a front end and a rear end;
 - planarizing an upper surface of said pole piece;
 - forming on said planarized pole piece a first alumina patch layer;
 - forming, by plating, a first conductive coil element on said patch layer, the windings of said first coil element having an initial cross-sectional height and a width;
 - forming a first pole tip layer on the upper surface of the front end of said substrate and a first back-gap layer on the upper surface of the rear end of said substrate, said first coil element now being disposed between said first tip layer and first back-gap layer;
 - forming a first blanket photoresist layer over said first coil element and said first pole tip and back-gap layers, said layer filling gaps between the windings of said coil element and between said coil element and said first pole-tip layer and first back-gap layer and hardening said layer by a thermal process;
 - forming, by chemical-mechanical polishing, a common horizontal planar surface containing upper surfaces of said first coil element windings, said first pole-tip layer and

said first back-gap layer and the insulation layer therebetween; thereby reducing the initial height of said coil element windings to a final height;

forming on said common planar surface a second alumina patch layer, said layer being disposed between the upper surfaces of said first pole-tip and back-gap layers;

forming, by plating, on said second patch layer a second coil element, the windings thereof having a second cross-sectional height and width and said second coil element being in electrical contact with said first coil element to form a continuous two-element coil;

forming a second pole tip layer on the upper surface of the first pole tip layer and a second back gap layer on the upper surface of the first back gap layer;

forming a second photoresist layer over said second coil element, said layer filling gaps between windings of said second coil element and between said second coil element and said second pole tip and back-gap layers and hardening said layer by a thermal process;

forming, by chemical-mechanical polishing, a common horizontal planar surface containing upper surfaces of said second coil element windings and the insulation layer therebetween;

forming a third alumina layer on said second horizontal planar surface, the upper surface of said layer having substantially the same height as the upper surfaces of said second pole tip and back-gap layers;;

planarizing said second alumina layer forming, thereby, a common horizontal plane containing the upper surface of said alumina layer and upper surfaces of said second pole tip and back-gap layers;

forming a write gap layer on said plane, the write gap layer not covering the upper surface of the back gap layer;

forming an upper pole piece extending horizontally from said back-gap layer to said pole tip layer, said pole piece being formed on said back-gap layer and said write gap layer.

6. The method of claim 5 wherein the first final height of said first coil element windings is between approximately 2.5 and 1.0 microns.

7. The method of claim 5 wherein said alumina patch layers are formed to a thickness between approximately 1000 and 3000 angstroms.